

Claims

1. A fuel injection apparatus, having a high-pressure reservoir (7) by way of which fuel at high pressure is delivered to a fuel injector (40), having a control chamber (41) actuating an injection valve member (44) of the fuel injector (40) and a nozzle chamber (48) surrounding the injection valve member (44), the high-pressure reservoir (7) and the fuel injector (40) communicating with one another via a high-pressure line (8, 27), characterized in that a compensation device (9) is located in the high-pressure line (8, 27) between the high-pressure reservoir (7) and the fuel injector (40) and between them establishes either a throttled connection (19) or an unthrottled connection (21).
2. The fuel injection apparatus as recited in claim 1, characterized in that the compensation device (9) includes a pistonlike compensation element (11) located displaceably inside a housing (28).
3. The fuel injection apparatus as recited in claim 2, characterized in that the compensation element (11) is acted upon on one of its face ends (13, 14) by a prestressing spring, which positions the compensation element (11) against a stop (12) located in the housing of the compensation device (9).
4. The fuel injection apparatus of claim 3, characterized in that the housing (28) includes an inlet (16), by way of which a first face end (13) of the pistonlike compensation element (11) is acted upon by the high fuel pressure level prevailing in the high-pressure reservoir (7).
5. The fuel injection apparatus of claim 2, characterized in that at the housing, an outlet (17) discharging into the high-pressure line (27) can be opened by a slide (21), which after overcoming a stroke length (18) opens an unthrottled connection between the high-pressure reservoir (7) and the high-pressure line (27).

6. The fuel injection apparatus of claim 1, characterized in that the compensation device (9) has a first throttle restriction (19), integrated with the high-pressure line (27) and located outside the housing (28), and a further, second throttle restriction (20), associated with a differential pressure chamber (29) in the housing (28).

7. The fuel injection apparatus of claim 6, characterized in that the first throttle restriction (19) is connected parallel to a pressure chamber (10) of the housing (28).

8. The fuel injection apparatus of claim 7, characterized in that the first throttle restriction (19) is located in the high-pressure line (27) between a branch to the inlet (16) and the outlet (17) of the housing.

9. The fuel injection apparatus of claim 6, characterized in that the opening speed of the compensation element (11) received movably in the housing (28) depends on the throttle cross section of the second throttle restriction (20) located downstream of the differential pressure chamber (29).

10. The fuel injection apparatus of claim 6, characterized in that a throttling segment (22) is located downstream of the first throttle restriction (19) and of the outlet (17) of the housing (28) of the compensation device.

11. The fuel injection apparatus of claim 1, characterized in that the first and second throttle restrictions (19), (20) are integrated into the compensation element (11).

12. The fuel injection apparatus of claim 11, characterized in that the throttle restrictions (19), (20) are embodied in a conduit (24) penetrating the compensation element (11).

13. The fuel injection apparatus of claim 11, characterized in that the first throttle restriction (19) discharges at a first face end (13) of the compensation element (11) and is in communication, via a branch (25), with an outlet (17) in the housing (28).

14. The fuel injection apparatus of claim 13, characterized in that the branch (25) discharges at the compensation element (11) in an annular chamber (26), whose axial length is equivalent to that of a slide opening (23) at the outlet (17) of the housing (28).

15. The fuel injection apparatus of claim 1, characterized in that the fuel injector (40) includes a pressure booster (30) that is integrated with it.

16. The fuel injection apparatus of claim 1, characterized in that the compensation device (9) is located in the high-pressure line (8, 27) between the high-pressure reservoir (7) and the fuel injector (40), on the end of the high-pressure line (8, 27) toward the high-pressure reservoir.